



AT OBSTACLES

FOR MULTIPLE OBSTACLES - SPECIFY VAR. IN 12'-6" INCREMENTS.

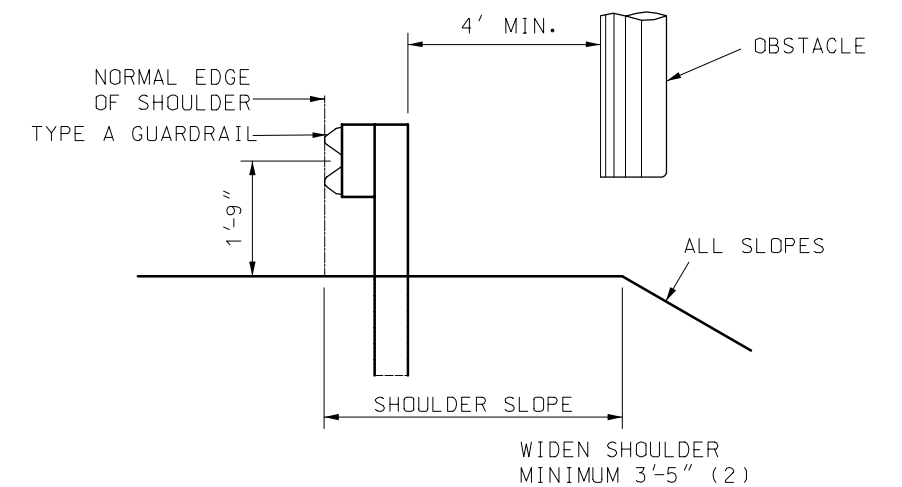
GUARDRAIL LOCATIONS

LEGEND

The diagram illustrates the layout of a bridge approach. It shows a cross road intersecting with a bridge. The bridge approach includes ramps, shoulder lines, and bridge anchor sections. Key dimensions and labels include:

- CROSS ROAD**: The road intersecting the bridge.
- RAMP**: The sloped sections of the bridge approach.
- SHOULDER LINE**: The boundary line of the shoulder.
- BRIDGE ANCHOR SECTION**: The section of the bridge approach adjacent to the bridge.
- BRIDGE**: The main structure of the bridge.
- (1)**: A dimension indicating the length of the bridge anchor section.
- VAR**: A dimension indicating the variable length of the bridge anchor section.

BRIDGE ENDS
GUARDRAIL LOCATION AT INTERCHANGE

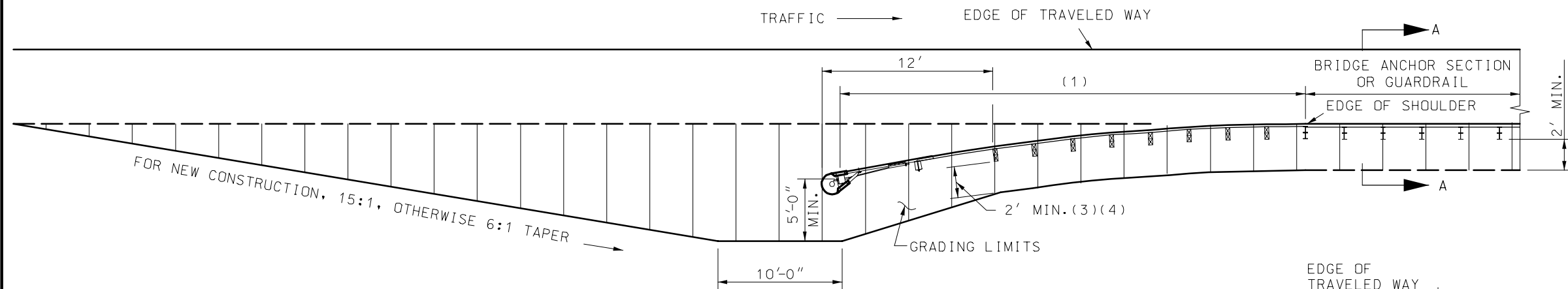


LOCATION OTHER THAN C MEDIAN

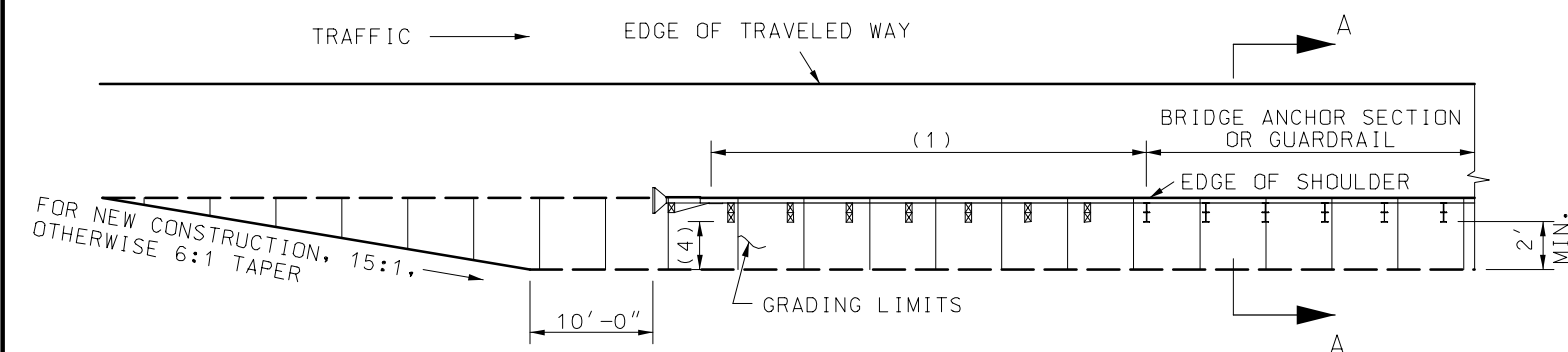
LATERAL PLACEMENT OF GUARDRAIL FOR SHOULDER INSTALLATION

- (1) APPROVED TYPE A CRASHWORTHY END
TERMINAL.
- (2) SHOULDER WIDENING SHALL CONSIST
OF EMBANKMENT MATERIAL COMPACTED
IN ACCORDANCE WITH SECTION 203.4
OF THE STANDARD SPECIFICATIONS.
- (3) WHEN GUARDRAIL IS CONSTRUCTED
OVER CURBS, THE CURBS SHALL BE
CONSTRUCTED AS SHOWN.

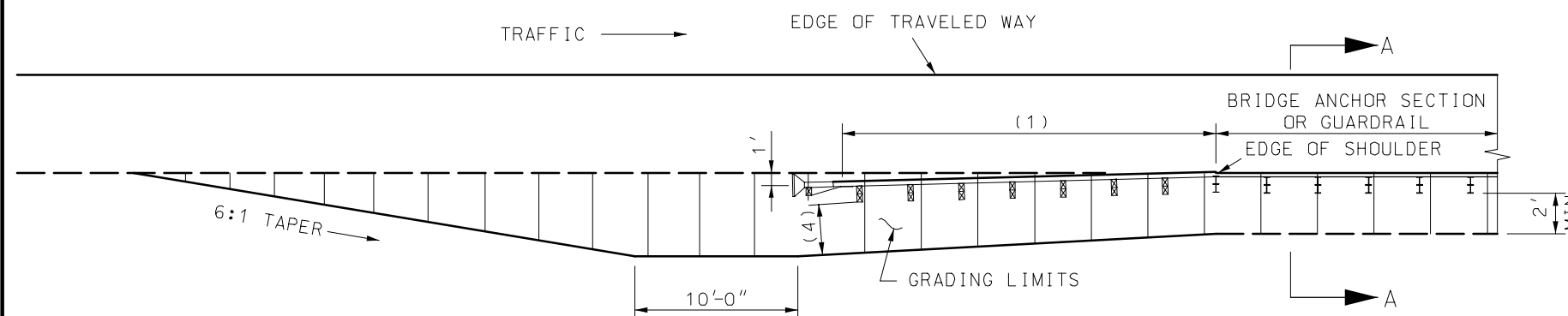
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
	GUARDRAIL		
DATE: _____	EFFECTIVE: 07-01-2004	606.00AQ	1 15



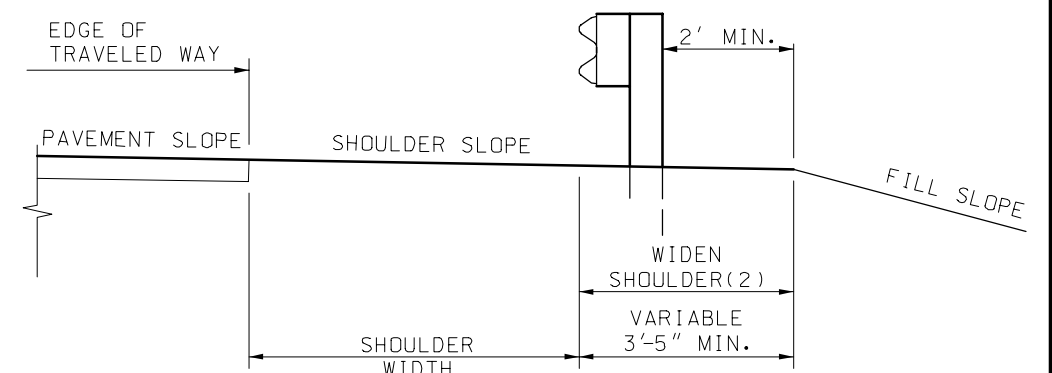
GRADING LIMITS FOR TYPE A FLARED CRASHWORTHY END TERMINAL



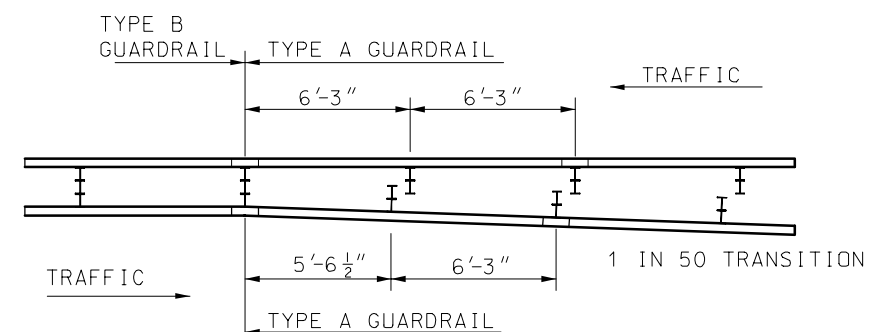
GRADING LIMITS FOR TYPE A NON-FLARED CRASHWORTHY END TERMINAL



GRADING LIMITS FOR TYPE A NON-FLARED OFFSET CRASHWORTHY END TERMINAL



SECTION A-A



**DETAIL FOR TRANSITIONING
BETWEEN TYPE A AND TYPE B GUARDRAIL**

GENERAL NOTES:

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH APPROVED SHOP DRAWINGS OF THE APPROVED CRASHWORTHY END TERMINAL.

END ANCHORS SHALL BE INSTALLED ON ENDS OF GUARDRAIL RUNS WHERE CRASHWORTHY END TERMINAL IS NOT REQUIRED.

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

GUARDRAIL

DATE: _____

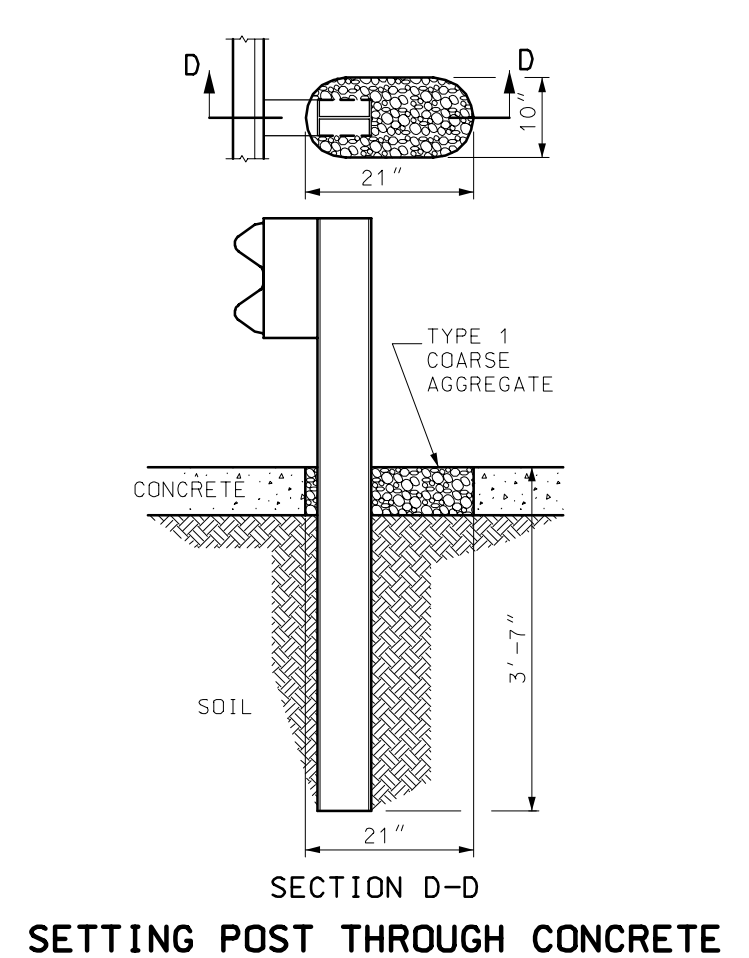
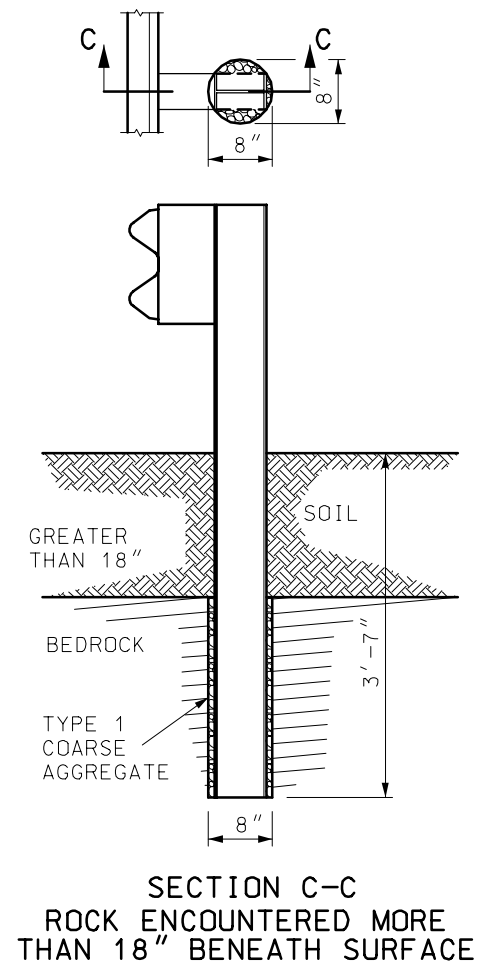
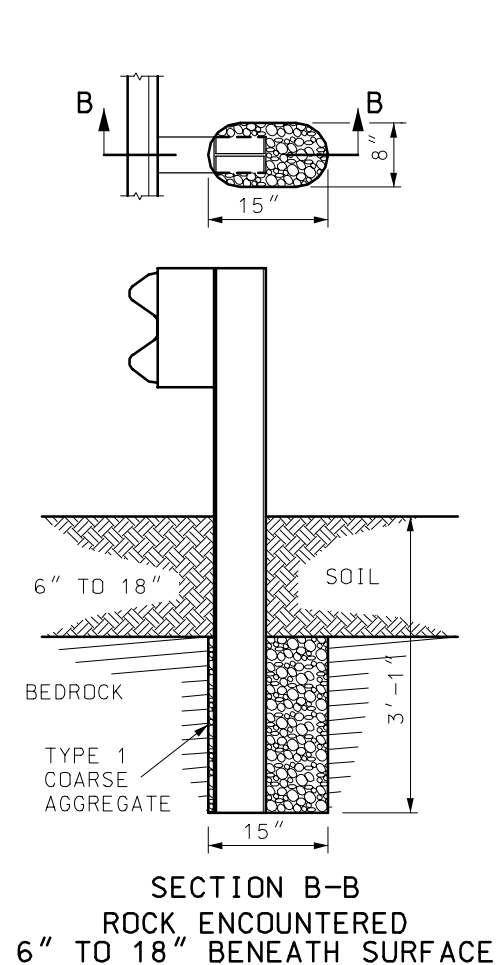
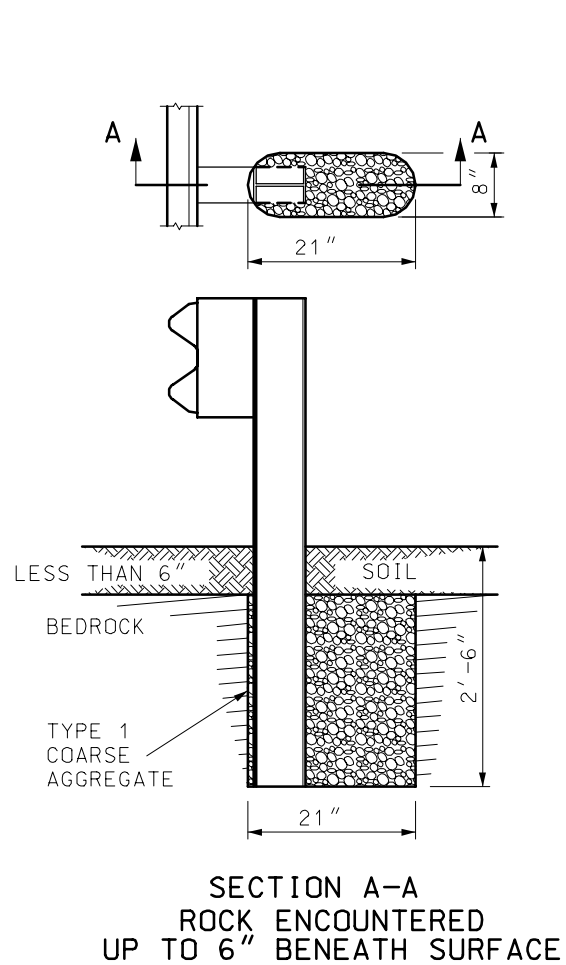
EFFECTIVE: 07-01-2004

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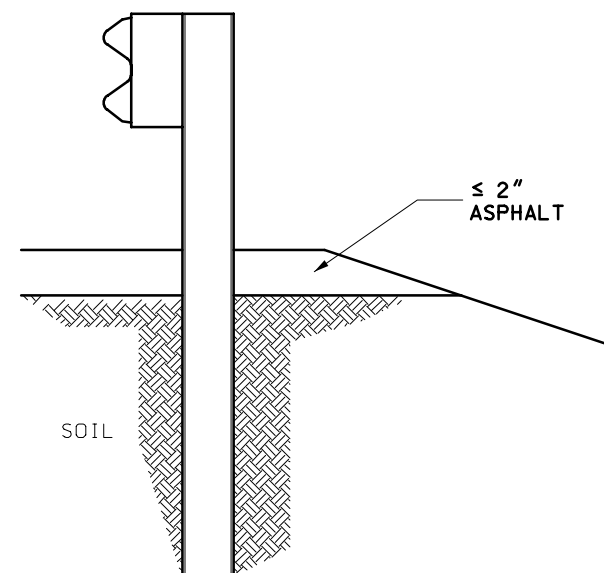
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- (1) APPROVED TYPE A CRASHWORTHY END TERMINAL.
- (2) SHOULDER WIDENING SHALL CONSIST OF EMBANKMENT MATERIAL COMPACTED IN ACCORDANCE WITH SECTION 203.4 OF THE STANDARD SPECIFICATIONS.
- (3) THE SLOPE SHOULD BREAK BEHIND THIRD POST.
- (4) AS PER MANUFACTURER'S SPECIFICATIONS, 2' MINIMUM. NO DIRECT PAY.



SETTING POST IN SOLID ROCK



GENERAL NOTES:

CONCRETE WHERE REQUIRED SHALL BE CLASS B OR OF A COMMERCIAL MIXTURE MEETING THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS. NO DIRECT PAYMENT WILL BE MADE FOR THIS CONCRETE OR ANY ADDITIONAL WORK INVOLVED.

HOLES IN SOLID ROCK SHALL PROVIDE A DIAMETER OF NOT LESS THAN 4 INCHES GREATER THAN THE MAXIMUM TRANSVERSE DIMENSION OF THE POST SECTION.

POST MAY BE SHORTER WHERE PLACED IN 2 FEET OF SOLID ROCK. STEEL POSTS MAY BE FLAME OR SAW CUT. REPAIR OF CUT SHALL BE IN ACCORDANCE WITH SECTION 712 OF THE STANDARD SPECIFICATIONS.

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

GUARDRAIL
SETTING POST IN SOLID
ROCK AND THROUGH
CONCRETE OR ASPHALT

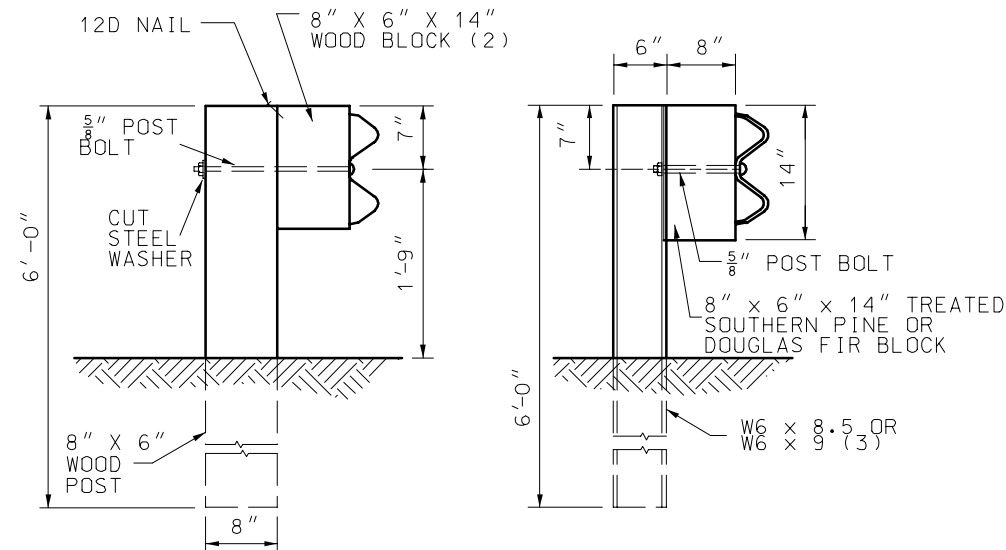
DATE: _____

EFFECTIVE: 07-01-2004

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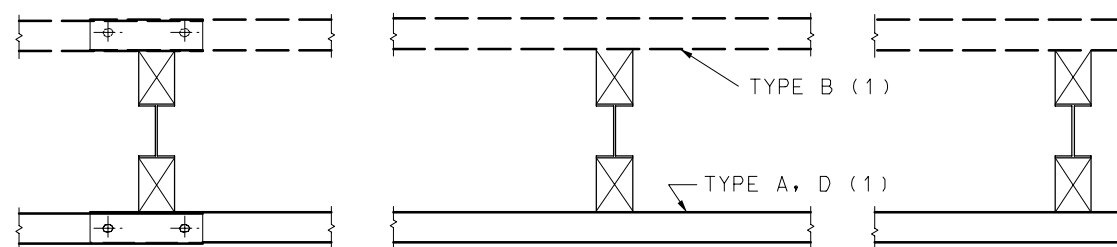
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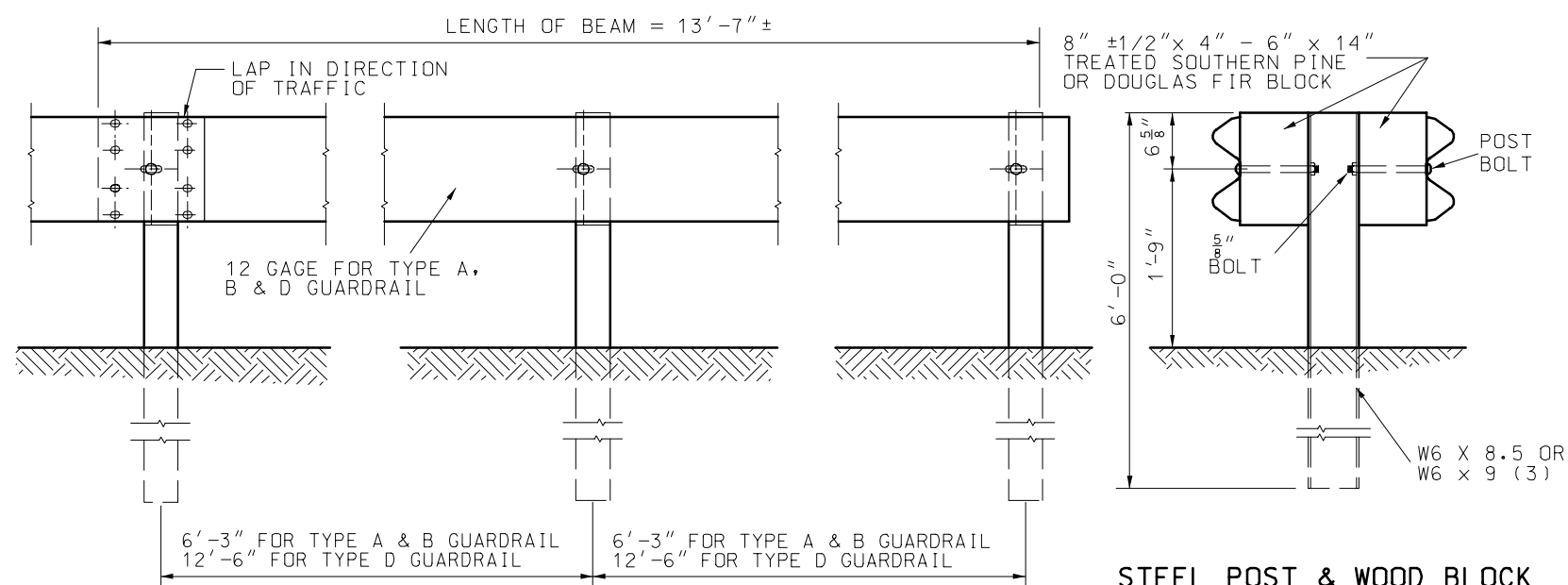


WOOD POST AND WOOD OR PLASTIC BLOCK
STEEL POST AND WOOD OR PLASTIC BLOCK
TYPE A AND D GUARDRAIL

- (1) END TREATMENT AS SPECIFIED ON PLANS.
- (2) AN ALTERNATE DESIGN, AN 8" X 4" X 14" WOOD BLOCK, MAY BE USED
- (3) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SECTION 1040.



PLAN



ELEVATION

STEEL POST & WOOD BLOCK

TYPE B GUARDRAIL

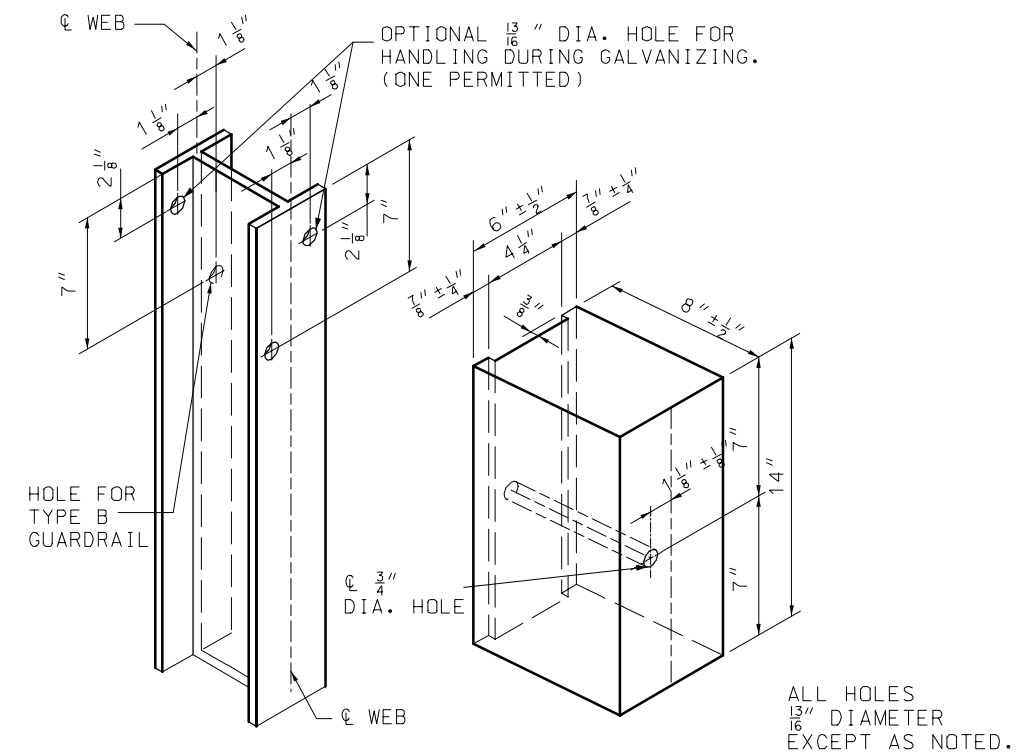
NOTE:
 FOR TYPE E GUARDRAIL AND TRANSITION
 DETAILS SEE SHEET 7 OF 15.

GENERAL NOTES:

WASHERS SHALL BE OMITTED ON ALL CONNECTIONS ON TYPE A, B AND D GUARDRAIL.

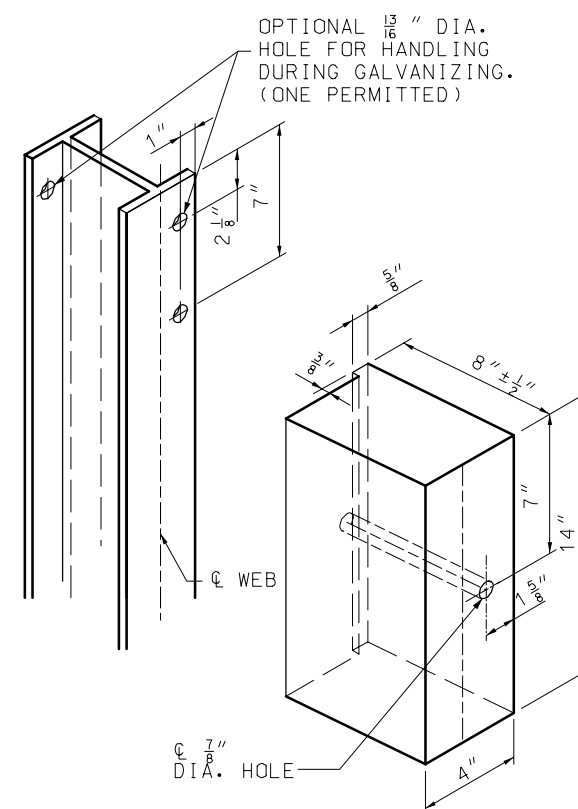
ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES EXCEPT WHERE ALLOWABLE TOLERANCES ARE SHOWN.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL TYPES A, B & D			
DATE: _____	EFFECTIVE: 07-01-2004	606.00AQ	4 15



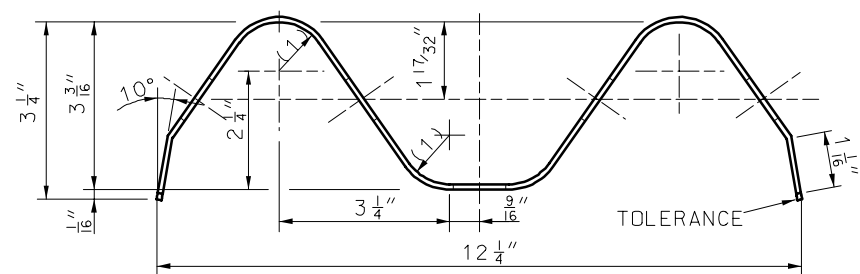
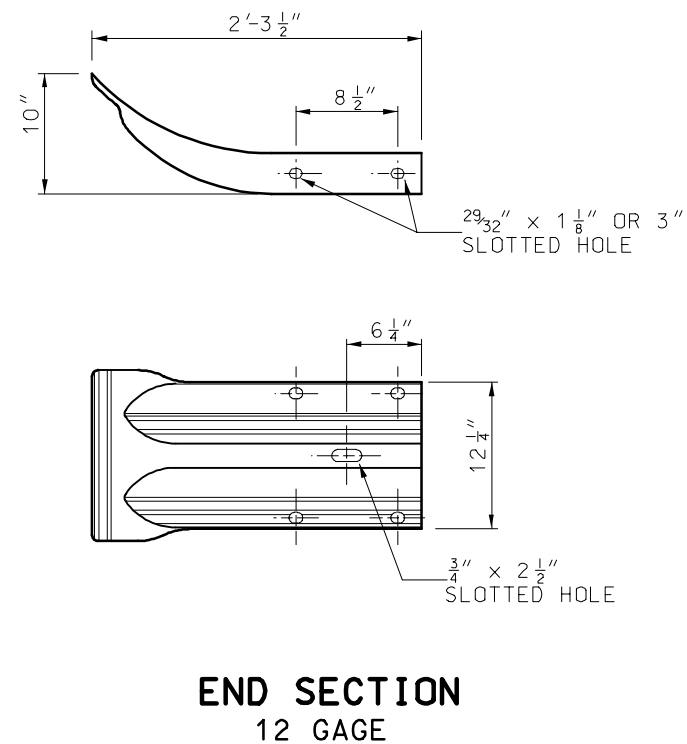
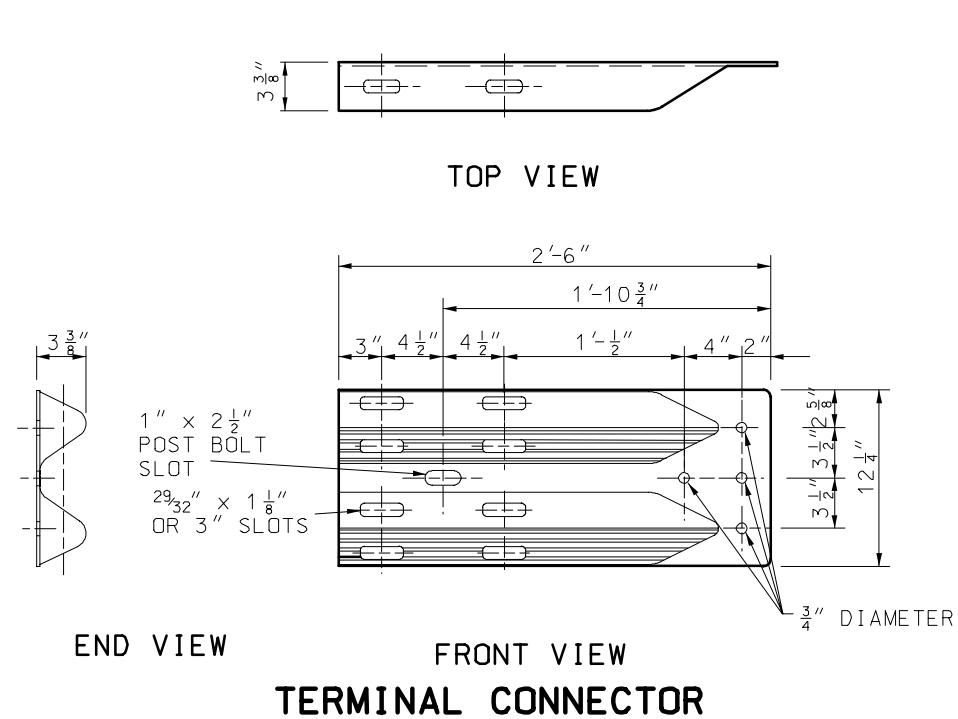
**HOLE PUNCHING DETAIL
FOR STEEL POST & WOOD OR PLASTIC BLOCKS (1)**

(1) THE OVERALL NOMINAL DIMENSIONS SHOWN SHALL BE MET, ALTHOUGH THE SHAPE OF THE PLASTIC BLOCKS MAY VARY FROM THE SHAPE SHOWN, EXCEPT THE $\frac{7}{8}$ " \pm $\frac{1}{4}$ " FLANGE AND THE OVERALL WIDTH DIMENSIONS MAY BE WAIVED IF APPROVED BY PROJECT OPERATIONS.

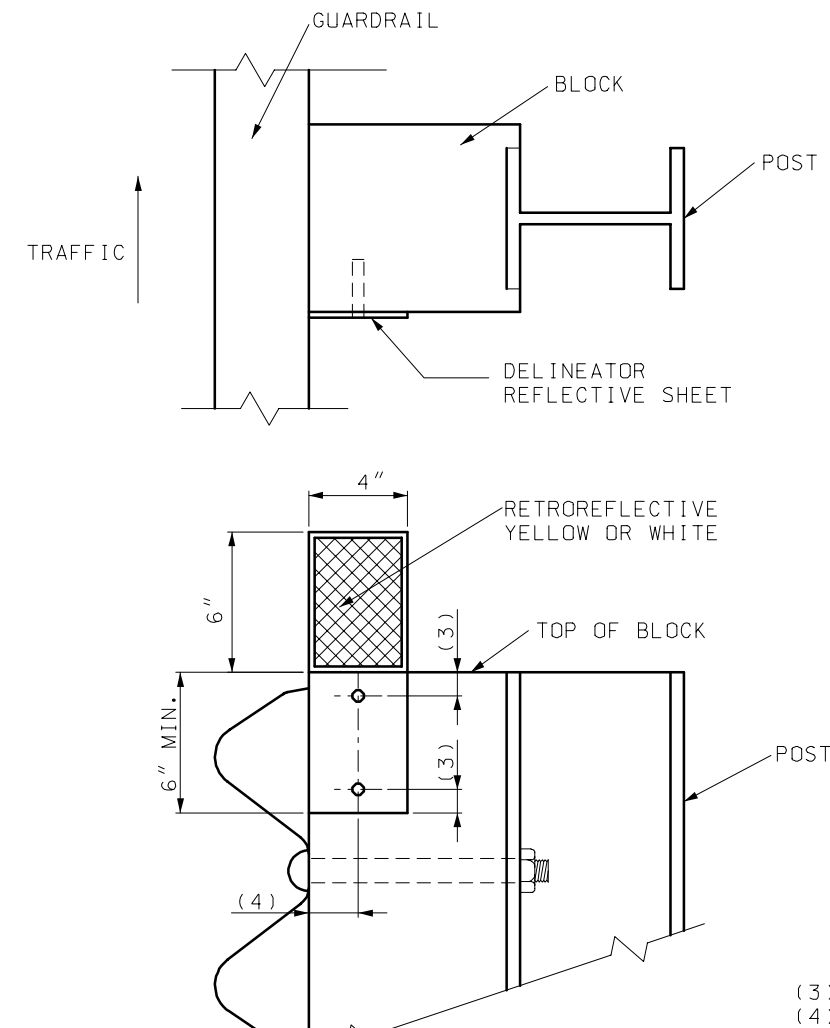
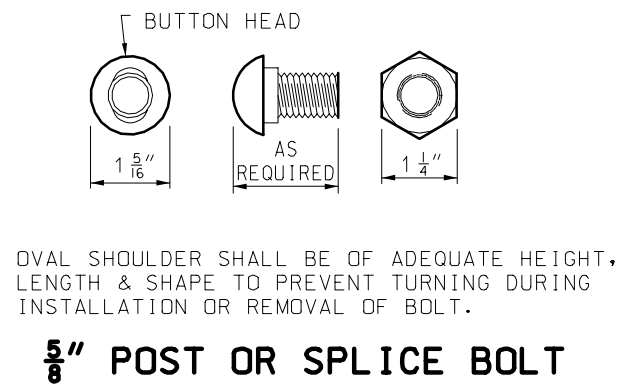
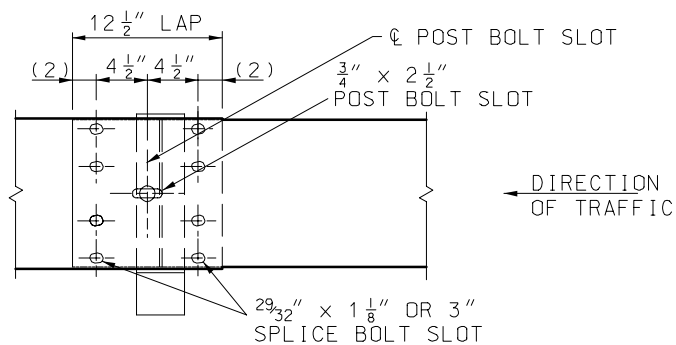


**ALTERNATE DESIGN
FOR WOOD BLOCK**

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL			
DATE: _____	EFFECTIVE: 07-01-2004	606.00AQ	5/15

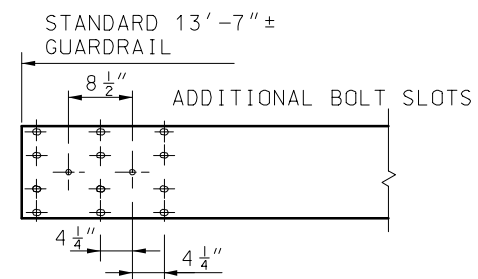


- (1) $\frac{15}{16}$ " RADIUS
 (2) 2" (TOLERANCE $+1\frac{1}{4}$ ", $-1\frac{1}{4}$ ")



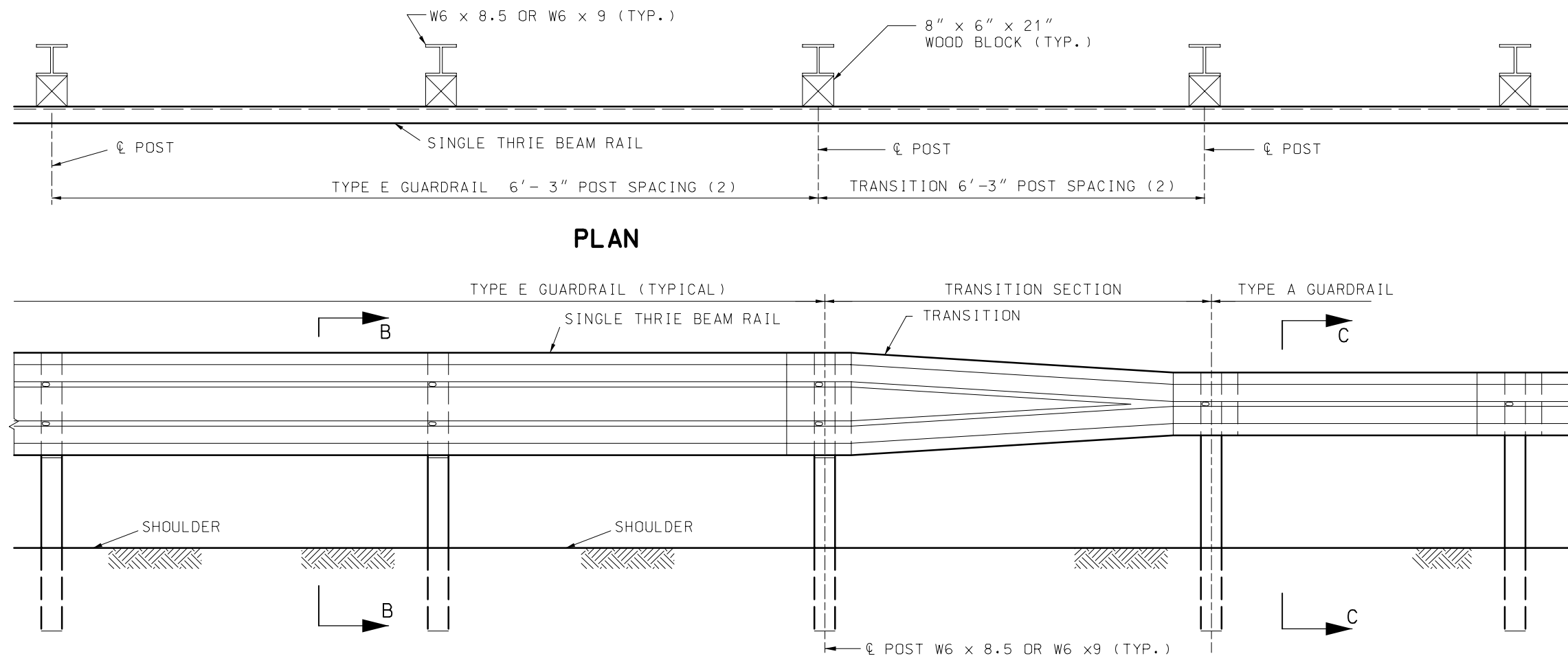
DELINEATORS ON NEW GUARDRAIL

NOTE: PORTIONS OF BEAM WITH UNUSED BOLT SLOTS TO BE LAPPED BEHIND.



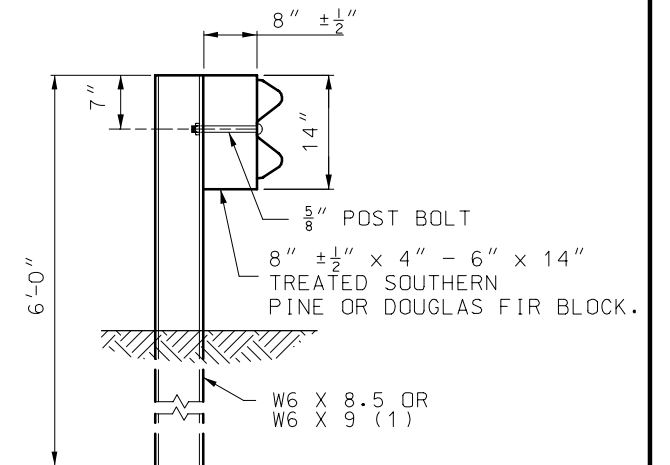
BEAM DETAILS SHOWING LOCATION OF ADDITIONAL BOLT SLOTS NECESSARY TO OBTAIN GUARDRAIL OFFSET.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL			
DATE: _____	EFFECTIVE: 07-01-2004	606.00AQ	6/15



PLAN

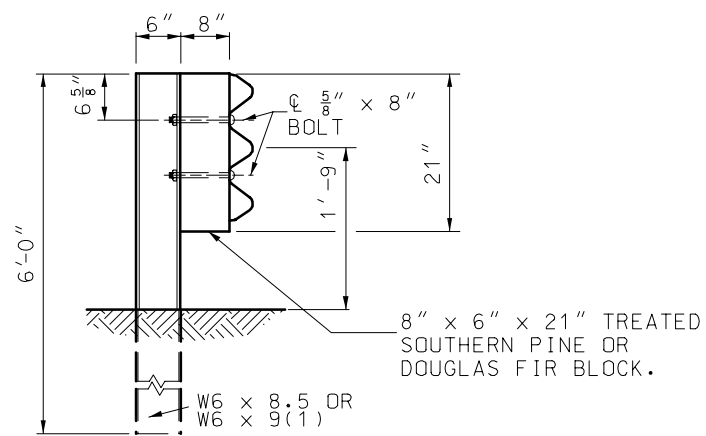
- (1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SECTION 1040.
- (2) IF THE TRANSITION IS CONNECTED TO A BRIDGE ANCHOR SECTION, POST SPACING FOR TYPE E GUARDRAIL AND THE TRANSITION SECTION SHALL BE 3'-1 1/4". FOR ALL OTHER CASES, POST SPACING SHALL BE 6'-3".



SECTION C-C
FOR WOOD BLOCKS

PART SECTION SHOWING TYPE E TO TYPE A GUARDRAIL TRANSITION

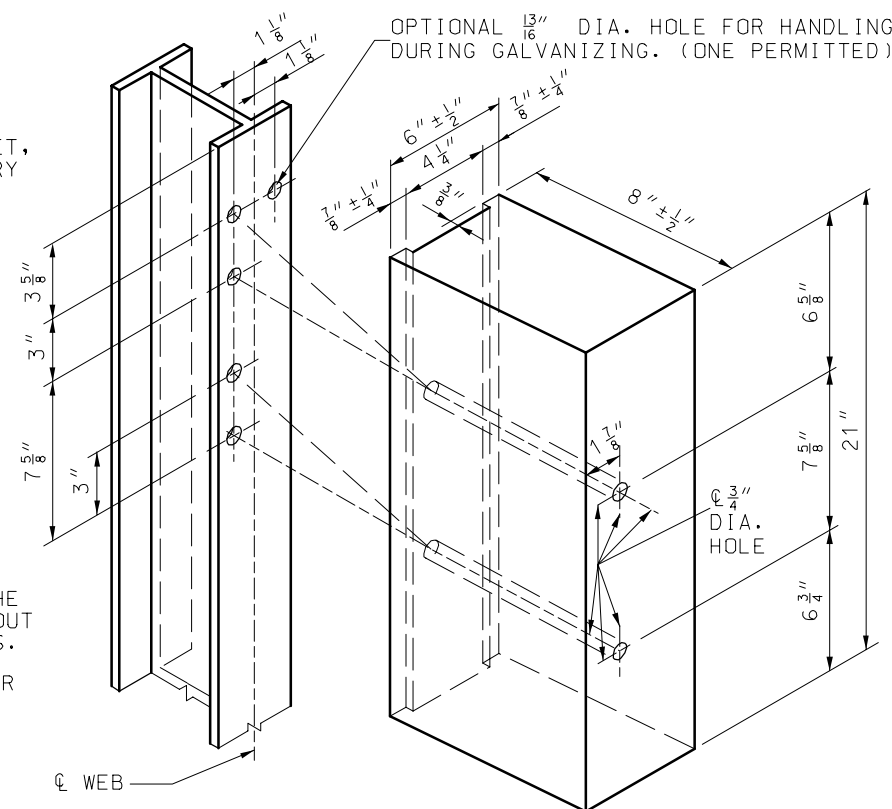
THE OVERALL NOMINAL DIMENSIONS SHOWN SHALL BE MET, ALTHOUGH THE SHAPE OF THE PLASTIC BLOCKS MAY VARY FROM THE SHAPE SHOWN, EXCEPT THE 7/8" +/- 1/4" FLANGE AND THE OVERALL WIDTH DIMENSIONS MAY BE WAIVED IF APPROVED BY PROJECT OPERATIONS.



SECTION B-B
FOR WOOD BLOCKS

NOTE: BLOCKS SHALL BE THE SAME TYPE THROUGHOUT THE PROJECT LIMITS.

ALL HOLES 13/16" DIAMETER EXCEPT AS NOTED



HOLE PUNCHING DETAIL
FOR STEEL POST & WOOD OR PLASTIC BLOCKS

GENERAL NOTES:

TYPE E GUARDRAIL SHALL USE 6'-3" POST SPACING UNLESS 3'-1 1/2" POST IS SPECIFIED.

THE THRIE BEAM RAIL FOR THE TYPE E GUARDRAIL AND THE TRANSITION SECTION SHALL BE MADE OF STEEL AND SHALL BE 12 GAUGE.

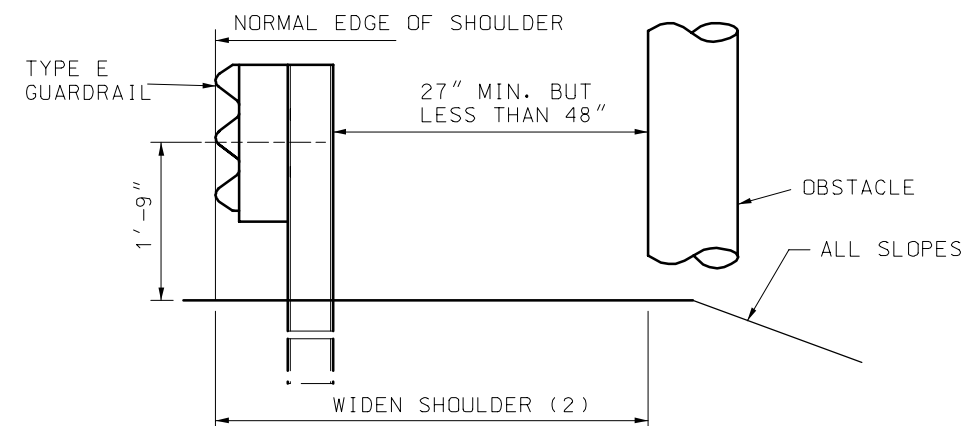
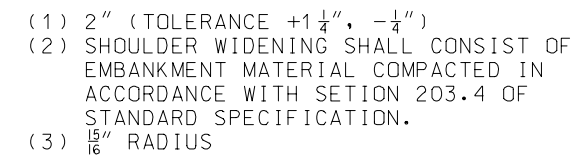
FOR PROTECTIVE COATING AND MATERIAL REQUIREMENTS, SEE SECTION 1040 OF THE STANDARD SPECIFICATIONS.

SEE SHEET 3 OF 13 FOR REQUIREMENTS FOR SETTING POSTS AT OBSTRUCTIONS.

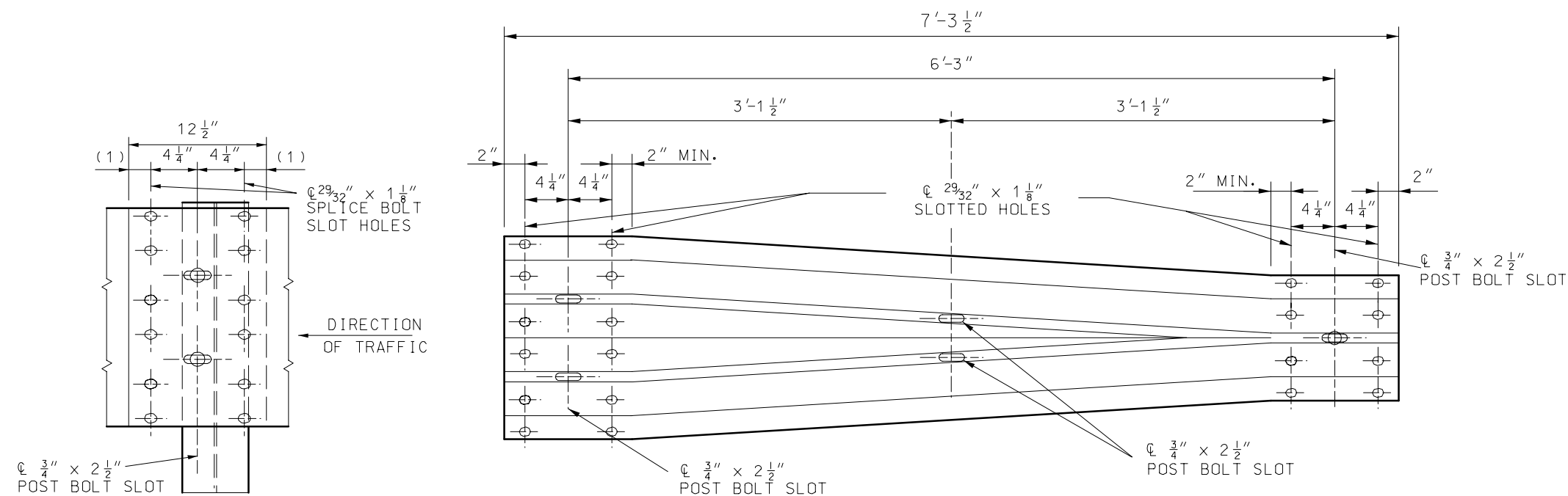
ALL DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES EXCEPT WHERE ALLOWABLE TOLERANCES ARE SHOWN.

FOR DETAILS NOT SHOWN, SEE OTHER SHEETS OF THIS DRAWING.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL TYPE E			
DATE: _____	EFFECTIVE: 07-01-2004	606.00AQ	7/15

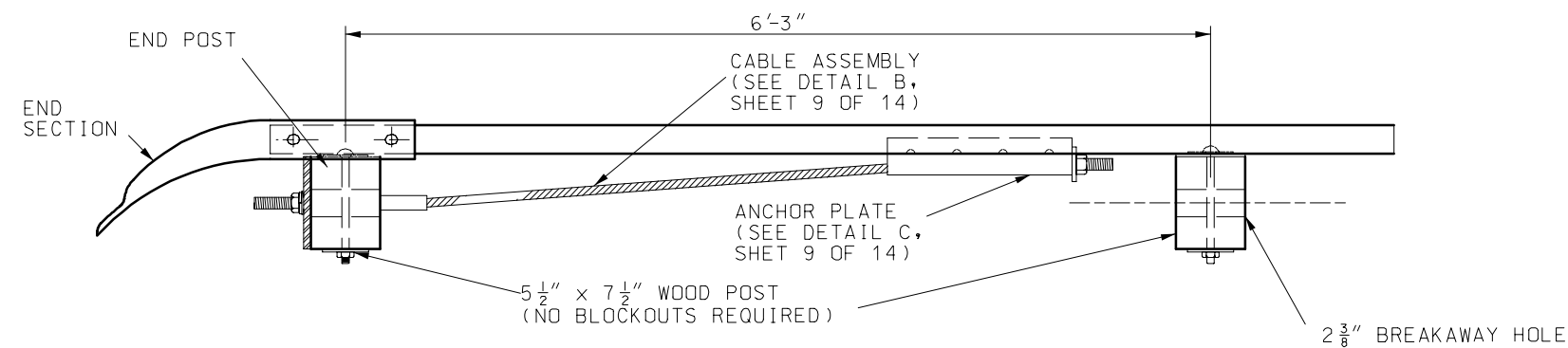


USE 25 FEET OF TYPE E GUARDRAIL PRECEDING THE OBSTACLE, AND THROUGH THE LIMITS OF THE OBSTACLE WHEN THE ABOVE CONDITION EXISTS.



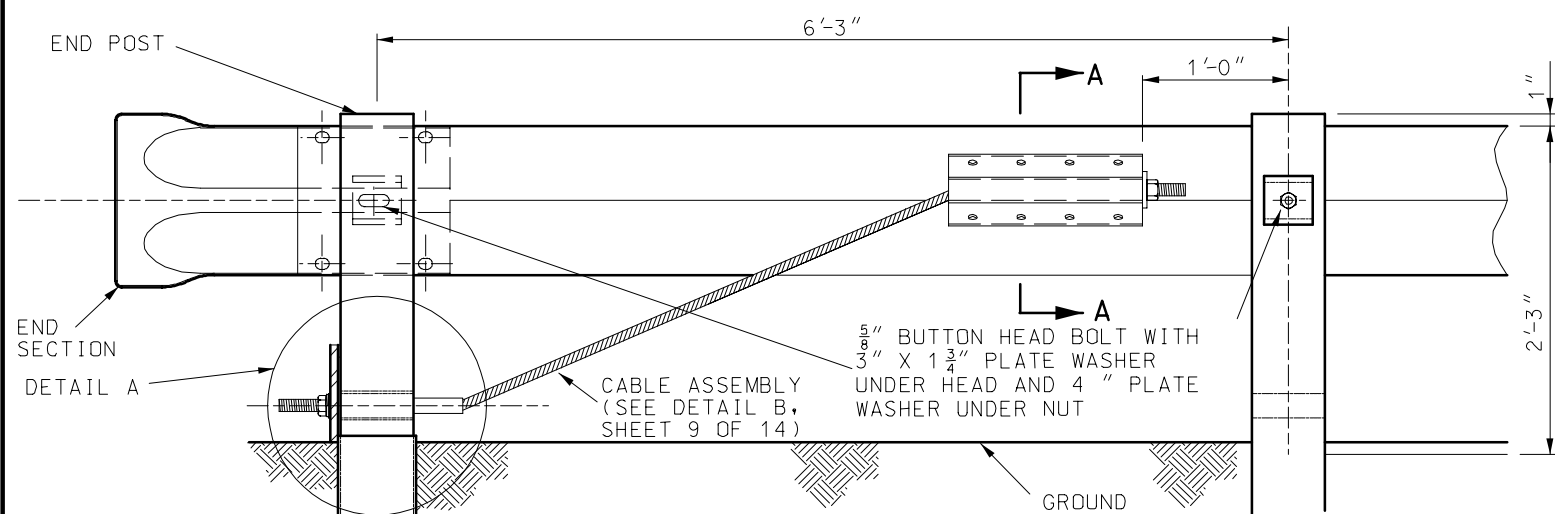
ELEVATION OF TRANSITION SECTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
	<div>GUARDRAIL TYPE E</div>		
DATE: _____	EFFECTIVE: 07-01-2004	606.00AQ	8 15



NOTE: SEE SHEET 6 OF 14 FOR
DETAILS OF END SECTION.

PLAN



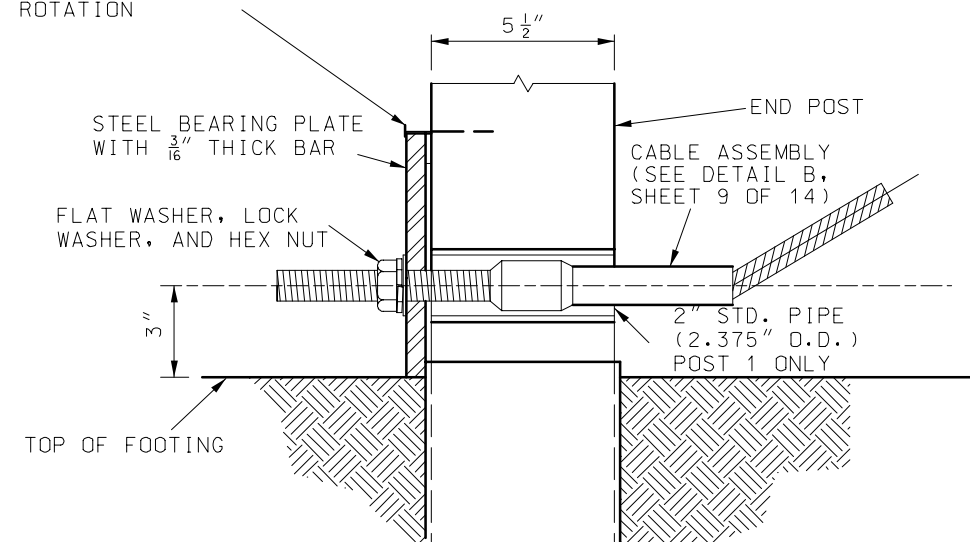
POST 1

ELEVATION
(BACK SIDE)

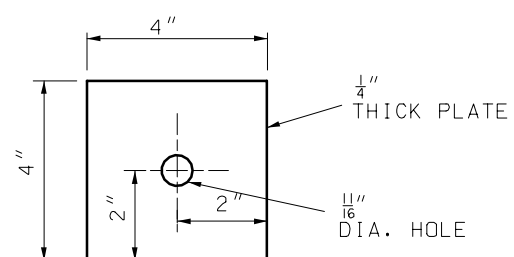
POST 2

END ANCHOR DETAILS

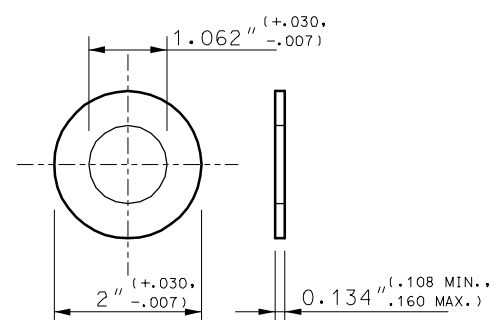
TWO 8D GALV. NAILS
TO PREVENT PLATE
ROTATION



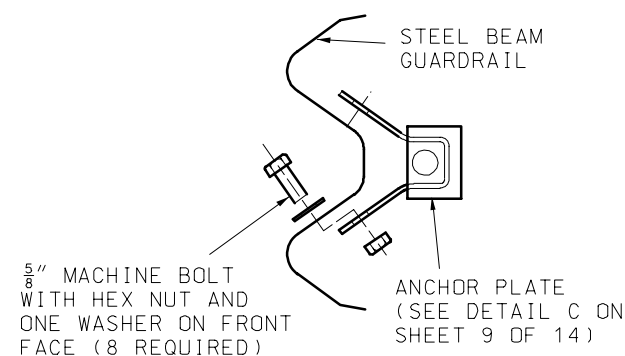
DETAIL A
(END POST DETAIL)



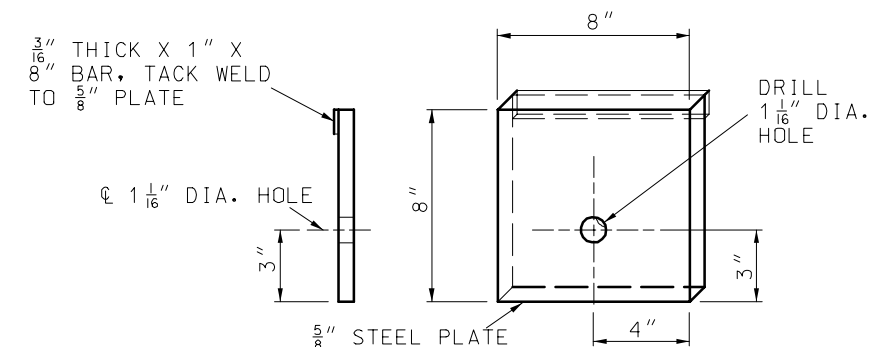
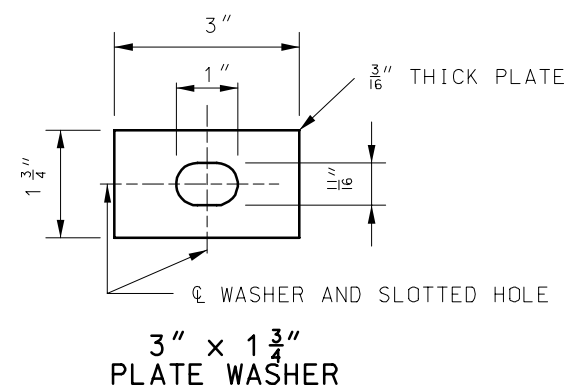
4" PLATE WASHER



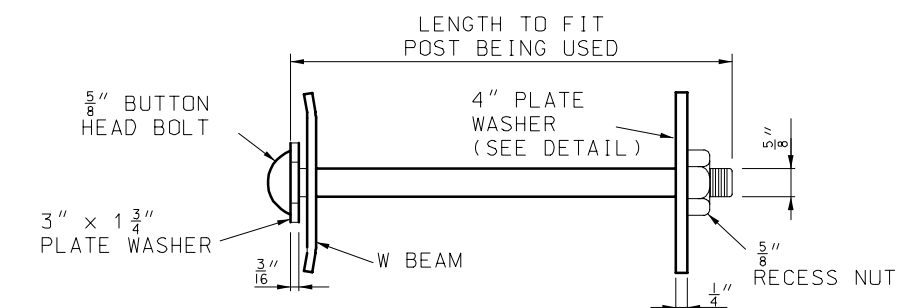
TYPE A WASHER



SECTION A-A



DETAIL OF STEEL BEARING PLATE



POST BOLT ASSEMBLY

GENERAL NOTES:

END ANCHOR DETAILS SHOWN SHALL BE USED ONLY ON
DOWN STREAM ENDS OF GUARDRAIL WHEN AN END ANCHOR
IS REQUIRED.

THE DETAILS SHOWN ARE FOR AN END ANCHORAGE SYSTEM
FOR GUARDRAIL. GUARDRAIL AND POSTS ARE PAID FOR
SEPARATELY.

CABLE ASSEMBLY AND ANCHOR PLATE SHALL BE SUBJECT TO
APPROVAL BY THE ENGINEER AND SHALL HAVE A MINIMUM
BREAKING STRENGTH OF 20 TONS.

ALL FITTINGS AND HARDWARE REQUIRED SHALL BE
GALVANIZED AFTER FABRICATION, SEE SECTION 1040
STANDARD SPECIFICATION.

WOOD POSTS 1 AND 2 SHALL BE 5 1/2" X 7 1/2".

SEE SECTION 1050 STANDARD SPECIFICATIONS FOR WOOD
POST.

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COMMISSION

GUARDRAIL END ANCHOR DETAILS

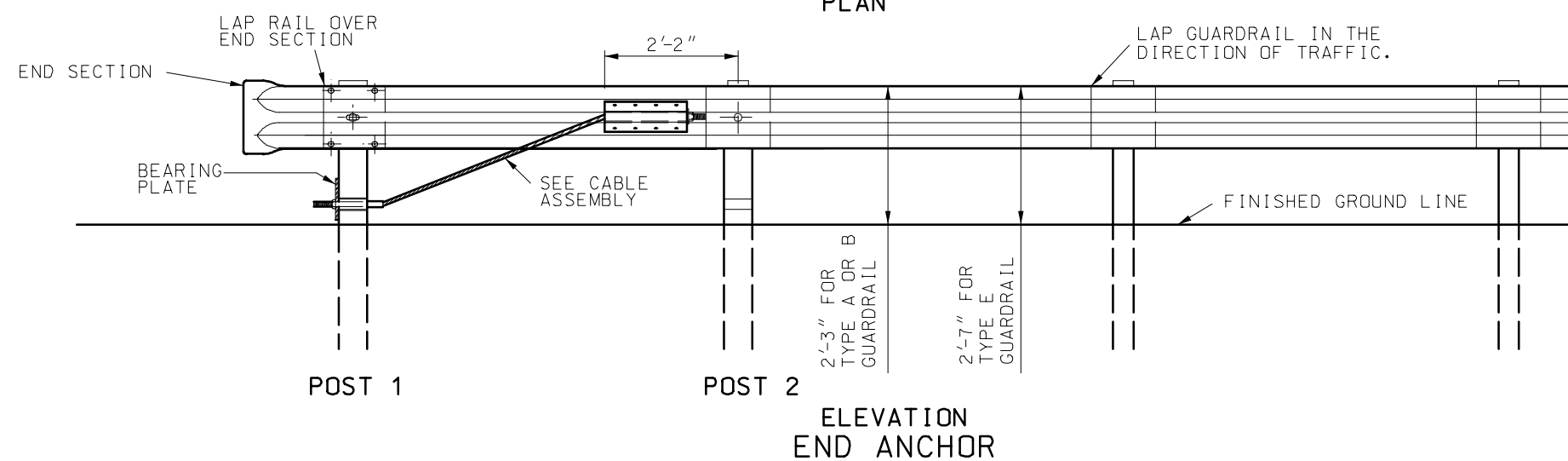
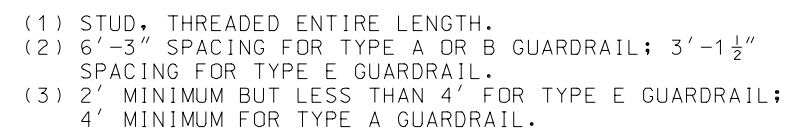
DATE: _____

EFFECTIVE: 07-01-2004

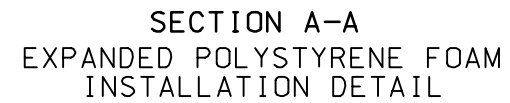
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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
	<div style="text-align: center;"> <h1>GUARDRAIL</h1> <h2>END ANCHOR DETAILS</h2> </div>		
DATE: _____	EFFECTIVE: 07-01-2004	606.00AQ	10 / 15



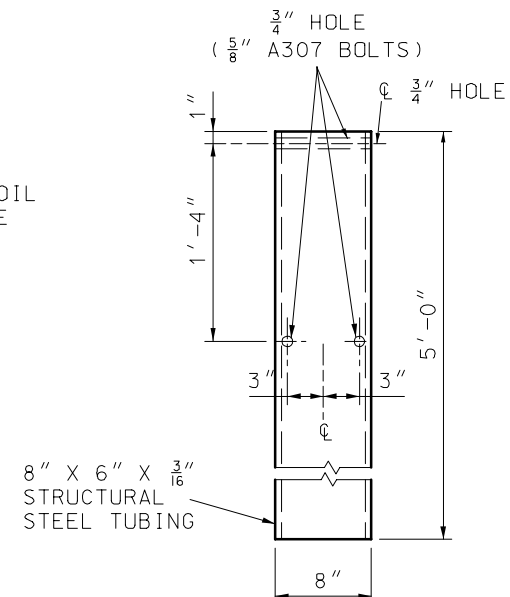
WOOD BREAKAWAY POST
SEE SECTION 1050

- (1) 5' - 9 $\frac{1}{2}$ " FOR CONCRETE FOUNDATION ALTERNATE.
- (2) 3' - 6 $\frac{1}{2}$ " FOR CONCRETE FOUNDATION ALTERNATE.



Technical drawing of a 1/4" SOIL PLATE with a 3/4" HOLE. The drawing includes a top view and a side view. The top view shows a central hole with a diameter of 3/4" and a depth of 8". The plate has a thickness of 1/4". The side view shows the plate is 1/4" thick. The hole is 8" deep. The plate is 8" wide and 8" high. The hole is centered in the plate.

SHOP WELDED
SOIL PLATE CONNECTION



STEEL TUBE

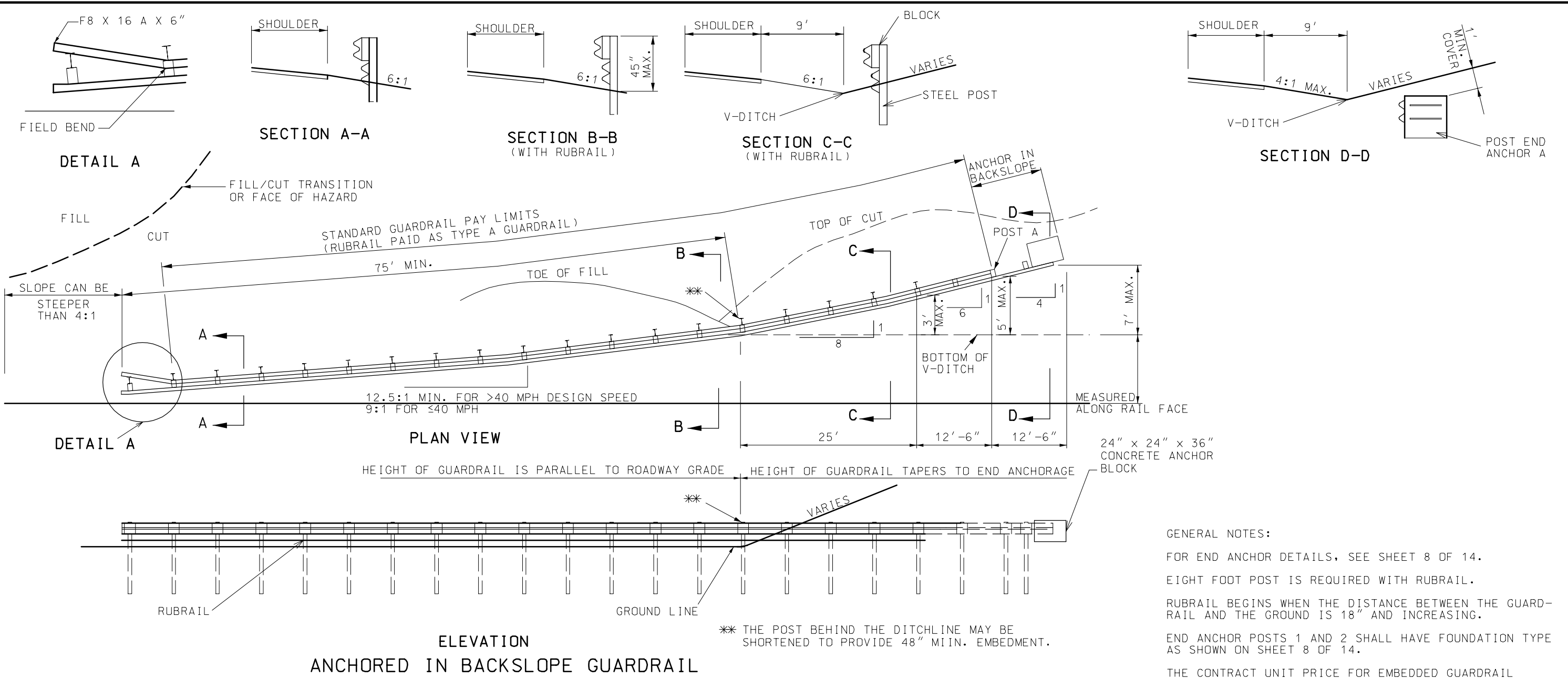
GENERAL NOTES:

THE CONTRACTOR HAS THE OPTION TO INSTALL WOOD POST 1 AND 2 IN STEEL TUBE OR CONCRETE FOUNDATION.

TRIMMING OF WOOD POST MAY BE NECESSARY FOR STEEL
TUBE FOUNDATION.

STEEL TUBE FOUNDATIONS SHALL BE DRILLED AND BACK-FILLED WITH A SUITABLE MATERIAL WHEN THE SOIL PLATE IS BOLTED, AS SHOWN, TO THE STEEL TUBE. STEEL TUBE FOUNDATION MAY BE DRIVEN WHEN THE SOIL PLATE IS WELDED, AS SHOWN, TO THE STEEL TUBE.

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
	GUARDRAIL		
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GENERAL NOTES:

FOR END ANCHOR DETAILS, SEE SHEET 8 OF 14.

EIGHT FOOT POST IS REQUIRED WITH RUBRAIL.

RUBRAIL BEGINS WHEN THE DISTANCE BETWEEN THE GUARDRAIL AND THE GROUND IS 18" AND INCREASING.

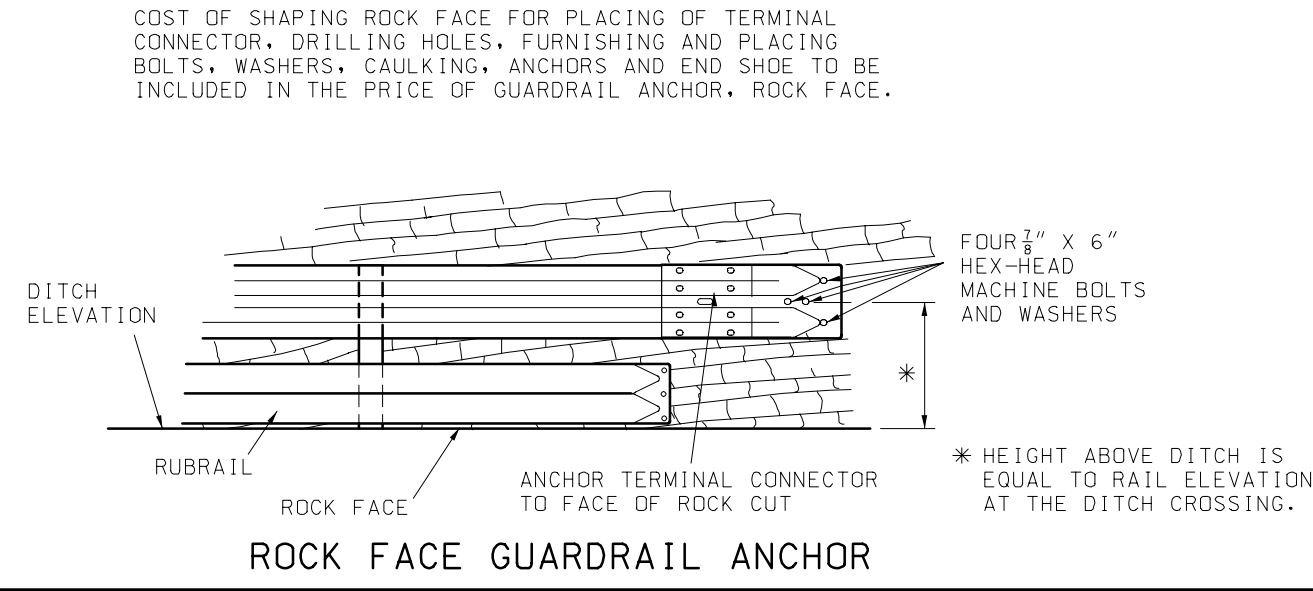
END ANCHOR POSTS 1 AND 2 SHALL HAVE FOUNDATION TYPE AS SHOWN ON SHEET 8 OF 14.

THE CONTRACT UNIT PRICE FOR EMBEDDED GUARDRAIL ANCHOR SHALL INCLUDE THE CONCRETE ANCHOR, EXCAVATION AND BACKFILLING, OR TERMINAL CONNECTOR, AND ALL INCIDENTAL HARDWARE AND WORK NECESSARY TO COMPLETE THE INSTALLATION.

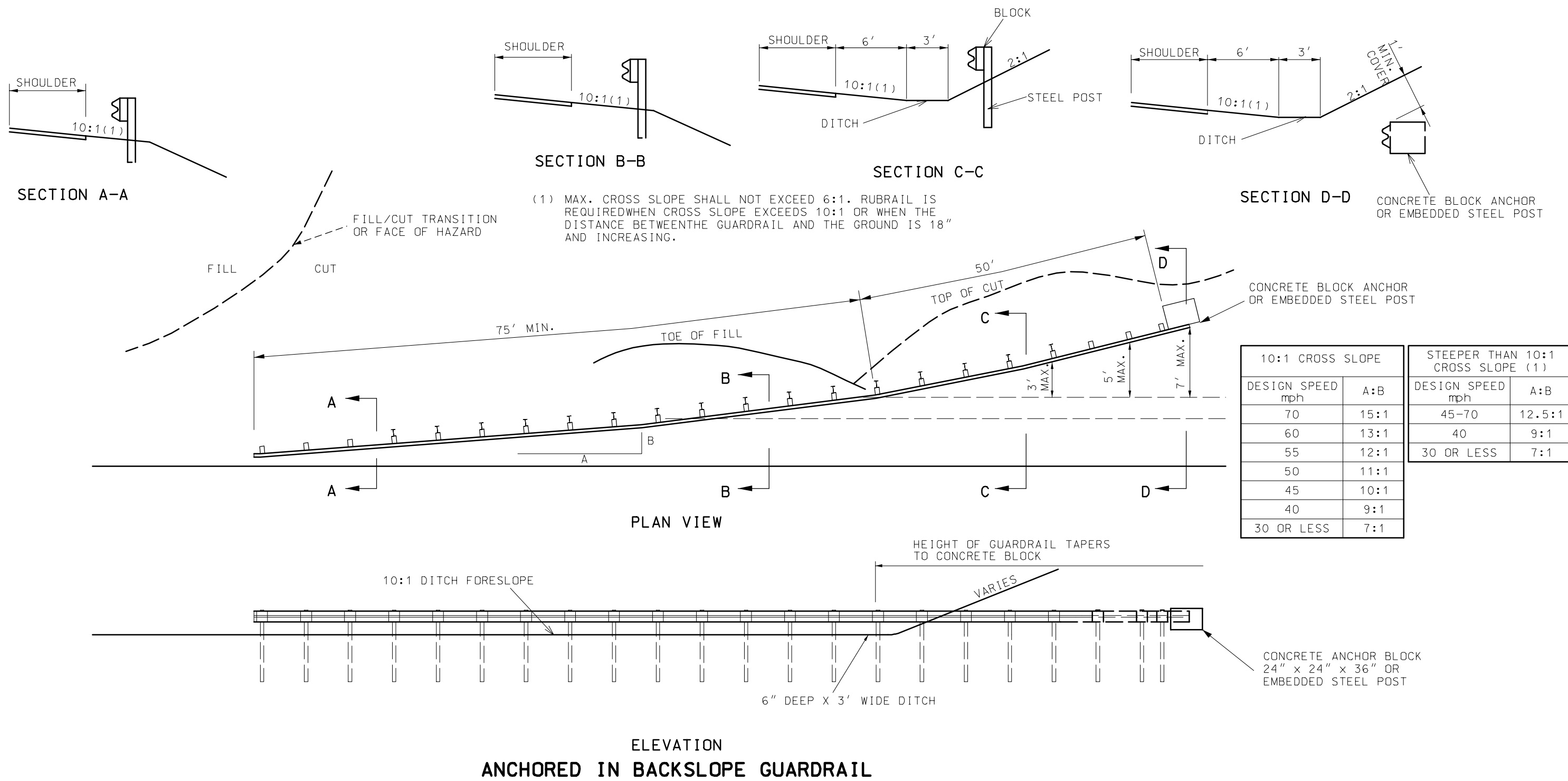
THE GUARDRAIL SHALL EXTEND 50' ± BEYOND THE DITCH LINE AND TERMINATE A MINIMUM OF 12 INCHES BELOW GROUND ELEVATION OF THE BACKSLOPE.

BLOCKOUTS WILL NOT BE REQUIRED FOR ANY POST WHICH WILL BE COMPLETELY BELOW GROUND. THE ALIGNMENT OF SUCH POSTS SHALL BE APPROVED BY THE ENGINEER.

SEE OTHER DRAWINGS AND STANDARD SPECIFICATIONS FOR MATERIAL AND CONSTRUCTION REQUIREMENTS NOT SHOWN.

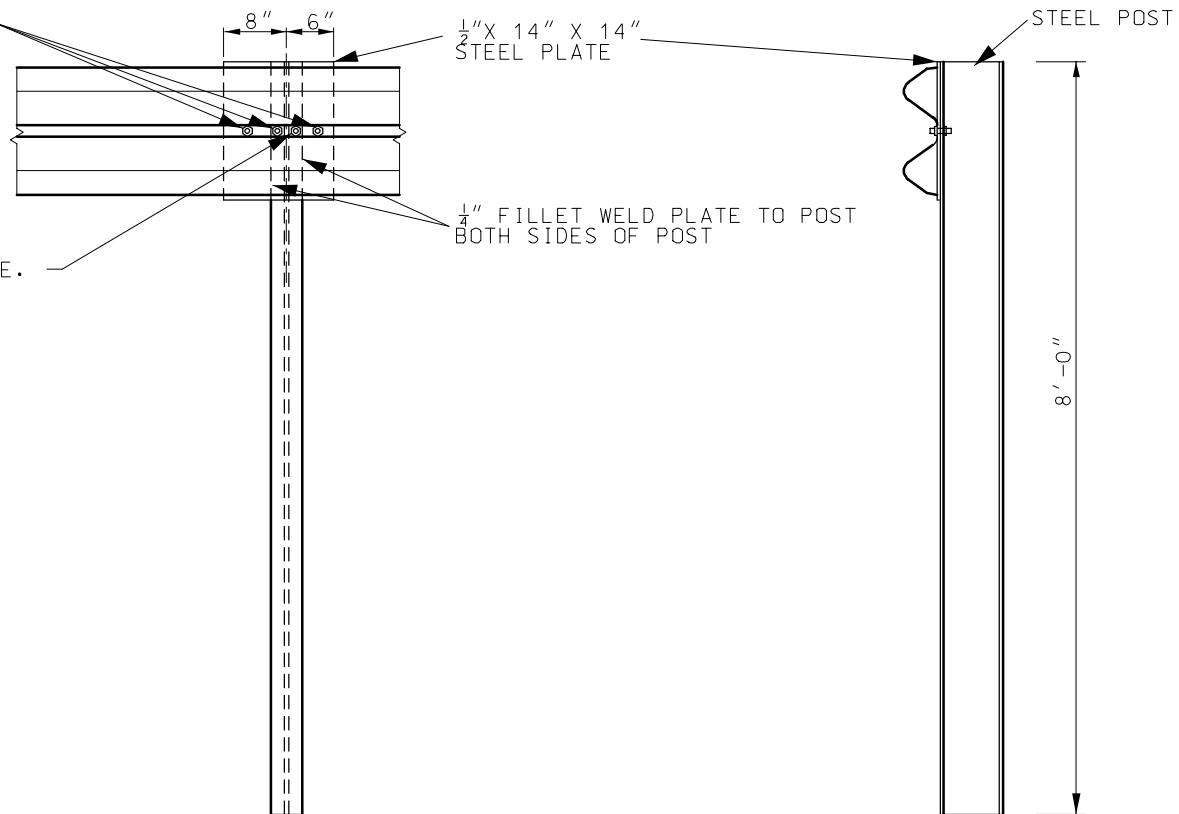


MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION			
GUARDRAIL ANCHOR IN BACKSLOPE WITH V-DITCH STEEPER THAN 10:1, 4:1 MAX. FORESLOPE			
DATE: _____	EFFECTIVE: 07-01-2004	606.00AQ	12/15



3 - 1" Ø HOLES TO BE FIELD DRILLED IN W-BEAM ELEMENT AND ATTACHED WITH 1/2" Ø HEX HEAD BOLTS 1 1/8" LONG EACH WITH ONE SQUARE WASHER AND HEX NUT.

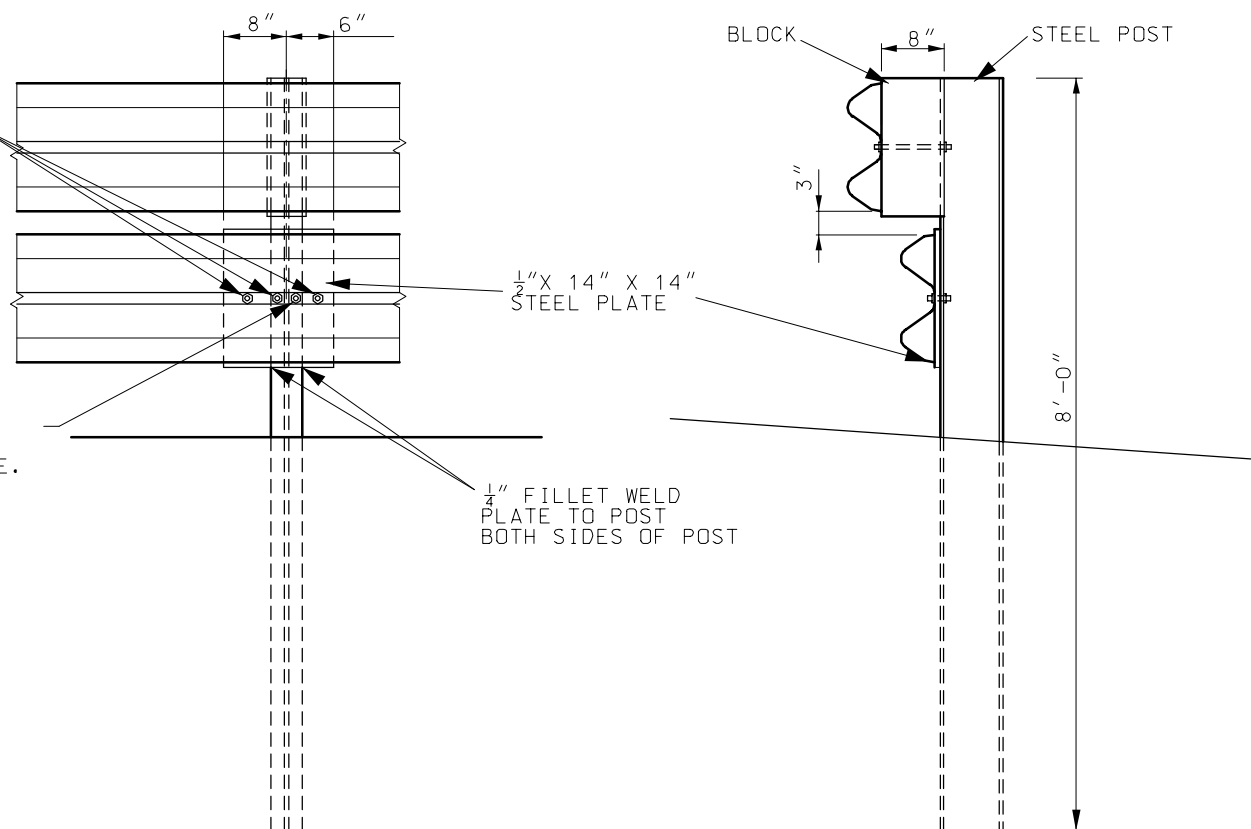
1" Ø HOLE TO BE FIELD DRILLED THROUGH W-BEAM AND THROUGH POST FLANGE. ATTACHED W-BEAM WITH 1/2" Ø HEX HEAD BOLT 2" LONG WITH ONE SQUARE WASHER AND HEX NUT.



EMBEDDED STEEL POST

3 - 1" Ø HOLES TO BE FIELD DRILLED IN W-BEAM ELEMENT AND ATTACHED WITH 1/2" Ø HEX HEAD BOLTS 1 1/8" LONG EACH WITH ONE SQUARE WASHER AND HEX NUT.

1" Ø HOLE TO BE FIELD DRILLED THROUGH W-BEAM AND THROUGH POST FLANGE. ATTACHED W-BEAM WITH 1/2" Ø HEX HEAD BOLT 2" LONG WITH ONE SQUARE WASHER AND HEX NUT.



SPECIAL RUBRAIL TO POST CONNECTION AT POST A

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

GUARDRAIL
ANCHORED IN BACKSLOPE
END ANCHORAGE DETAILS
EMBEDDED STEEL POST OPTION

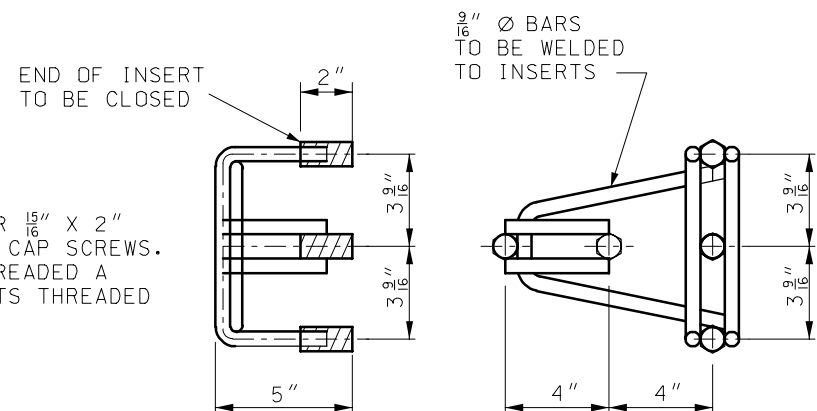
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EFFECTIVE: 07-01-2004

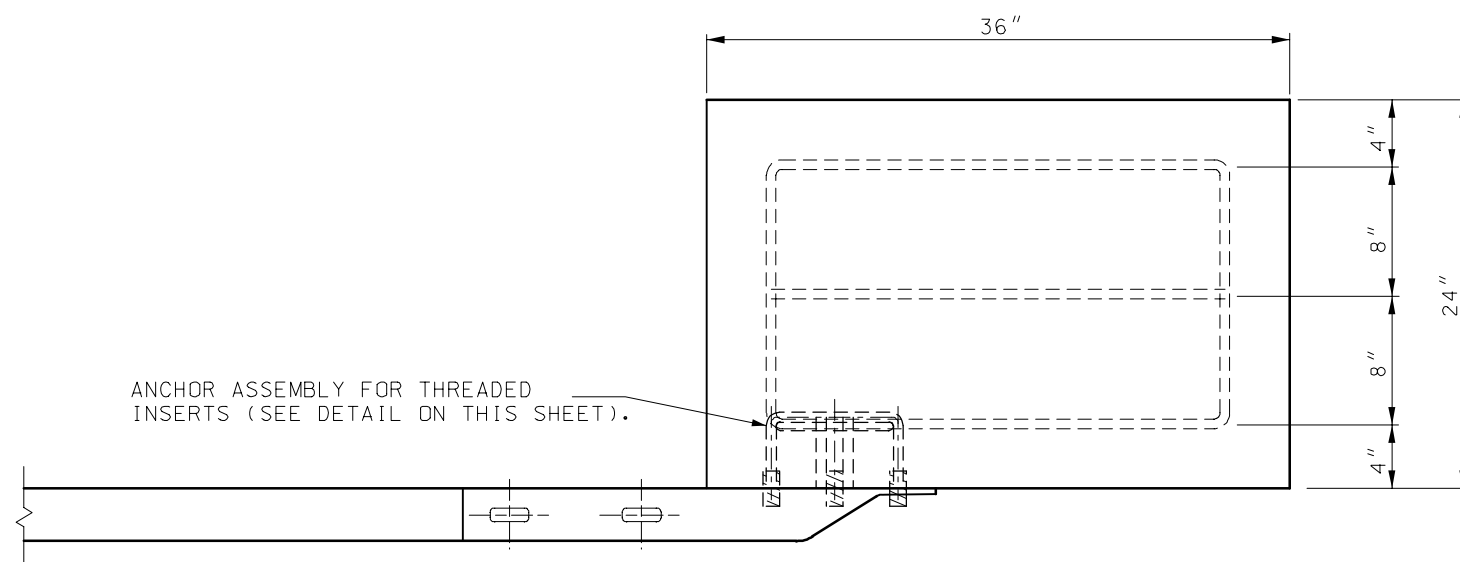
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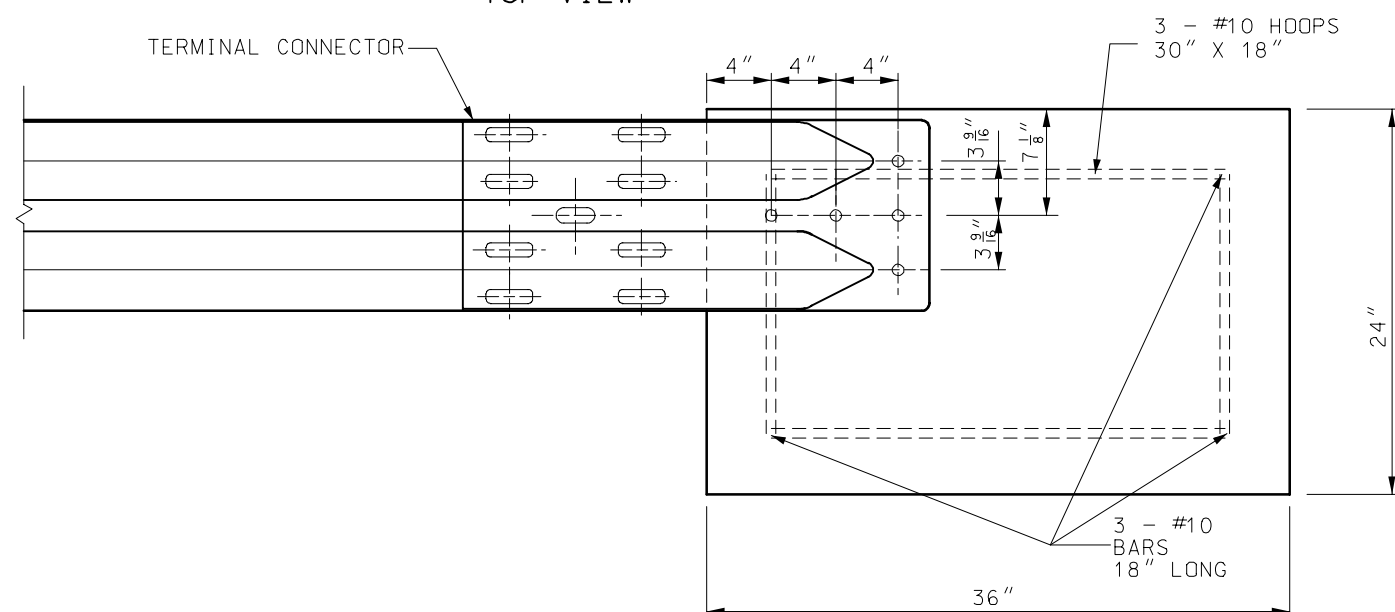
THREADED INSERTS FOR $\frac{15}{16}$ " X 2" GALVANIZED HEX HEAD CAP SCREWS. CAP SCREWS TO BE THREADED A MINIMUM $1\frac{7}{8}$ ". INSERTS THREADED MINIMUM OF $1\frac{3}{4}$ ".



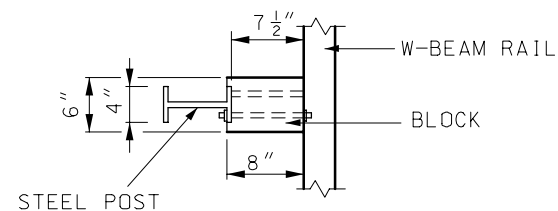
**CONCRETE BLOCK ANCHOR
ANCHOR ASSEMBLY**



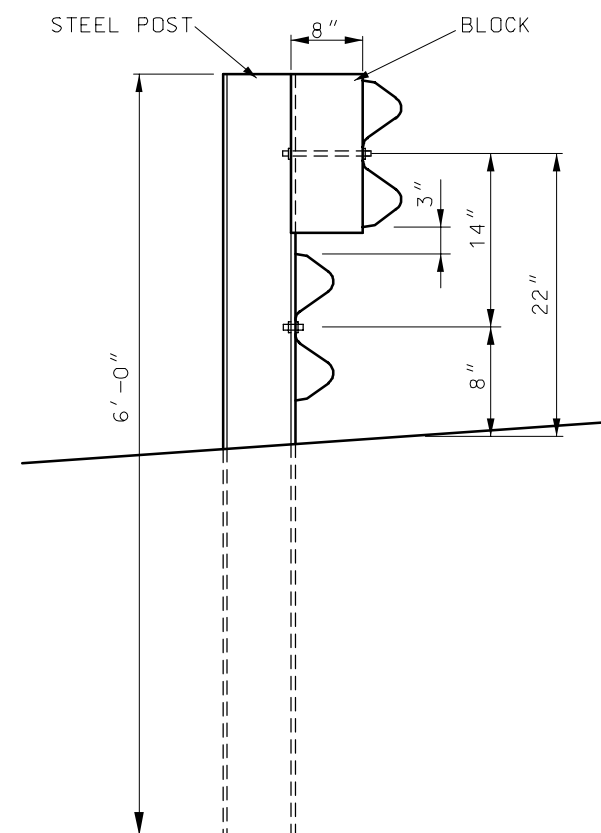
TOP VIEW



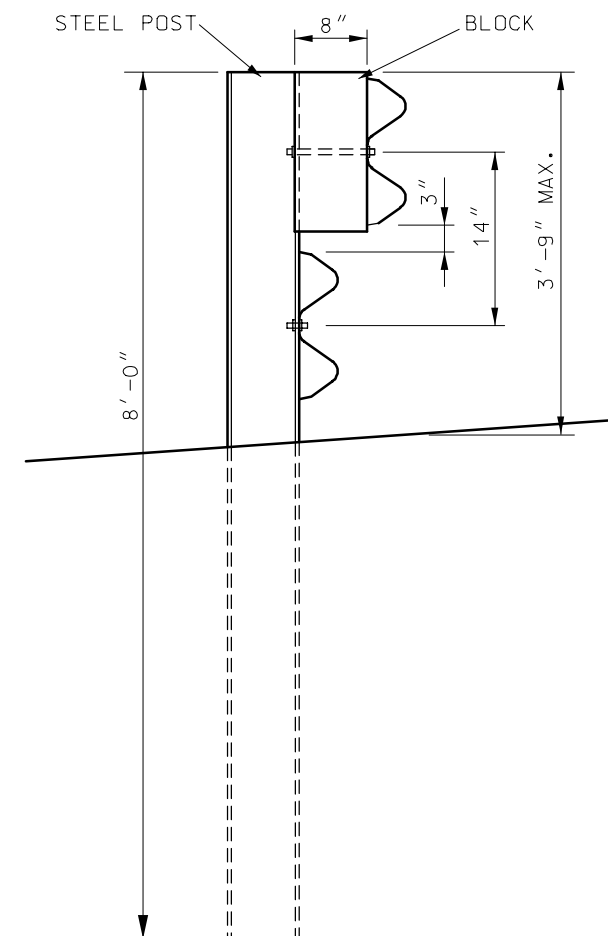
**ELEVATION
CONCRETE BLOCK ANCHOR
(24" X 24" X 36")**



PLAN

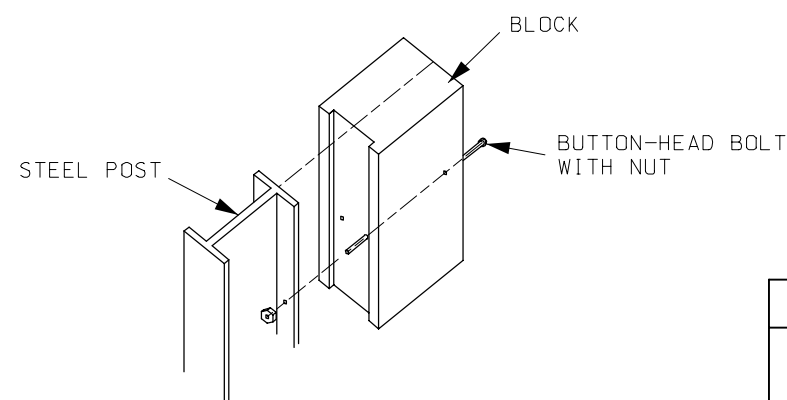


ELEVATION OF 6' POST



ELEVATION 8' POST

STEEL POST AND BLOCK DETAIL



EXPLODED VIEW

(RAIL AND WASHER NOT SHOWN)

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

**GUARDRAIL
ANCHORED IN BACKSLOPE
GENERAL DETAILS**

DATE: _____

EFFECTIVE: 07-01-2004

606.00AQ

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